REMARKS

Formalities

Claims 28-47 were examined, and stand rejected. Claim 52 has been added. Claims 1-27 and 48-51 were canceled previously. The amendments to the claims do not add or constitute new matter. Support for the amendments may be found throughout the specification, including Figures 3 and 4, and in the originally filed claims.

The foregoing amendments are made solely to expedite prosecution of the instant application, and are not intended to limit the scope of the invention. Further, the amendments to the claims are made without prejudice to the pending or now canceled claims or to any subject matter pursued in a related application. The Applicant reserves the right to prosecute any canceled subject matter at a later time or in a later filed divisional, continuation, or continuation-in-part application.

Upon entry of the amendment, claims 28-47 and 52 are pending in the instant application.

Rejection under 35 U.S.C. § 112, first paragraph

The Examiner rejected claims 28-47 under 35 U.S.C. § 112, first paragraph, for allegedly containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant respectfully traverses this rejection.

The Examiner has argued that the specification does not provide an enabling disclosure for how to use the transgenic mouse as claimed, essentially because the transgenic mouse allegedly does not exhibit a useful phenotype. The Examiner has stated that the specification fails to provide specific teachings on how to use the claimed mice with the phenotypes disclosed. Further, the Examiner has suggested that the specification and the prior art do not provide any teaching regarding the relationship between PTP36 function and the claimed phenotypes, and is silent on what type of disease is related to PTP36 dysfunction that would result in the disclosed phenotypes. Essentially, the Examiner is rejecting the claims for an alleged lack of utility.

Claims 28-47 are drawn to a transgenic mouse whose genome comprises a disruption in the PTP36 gene, which disruption results in specific phenotype relating to reproductive system abnormalities, abnormal body weight and abnormal organ weights.

Applicant submits that the Examiner's conclusions regarding the ability of the skilled artisan to use the claimed mouse are not consistent with the rules regarding the utility of an invention. Specifically, Applicant submits that the skilled artisan would recognize how to use the claimed transgenic mouse, including, but not limited to, as a means of determining or characterizing the role or function of the target PTP36 gene.

Under the Patent Office's Utility Requirement Guidelines:

> If at any time during the examination, it becomes readily apparent that the claimed invention has a well-established utility, do not impose a rejection based on lack of utility. An invention has a well-established utility if (i) a person of ordinary skill in the art would immediately appreciate why the invention is useful based on the characteristics of the invention (e.g., properties or applications of a product or process), and (ii) the utility is specific, substantial, and credible.
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> . . .
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> If the applicant has asserted that the claimed invention is useful for any particular practical purpose (i.e., it has a "specific and substantial utility") and the assertion would be considered credible by a person of ordinary skill in the art, do not impose a rejection based on lack of utility.

(emphasis added)(MPEP § 2107, II (A)(3); II (B)(1)). Thus, according to Patent Office guidelines, a rejection for lack of utility may not be imposed where an invention has either a well-established utility or is useful for a particular practical purpose. The present invention satisfies either standard.

The present invention has a well-established utility since a person of ordinary skill in the art "would immediately appreciate" how to use a knockout mouse. As a general principle, any knockout mouse has the inherent and well-established utility of defining the function and role of the disrupted target gene, regardless of whether the inventor has described any specific phenotypes, characterizations or properties of the knockout mouse. The sequencing of the human genome has produced countless genes whose function has yet to be determined. According to the National Institute of Health, knockout mice represent a critical tool in studying gene function:

> Over the past century, the mouse has developed into the premier mammalian model system for genetic research. Scientists from a wide range of biomedical fields have gravitated to the mouse because of its close genetic and physiological similarities to humans, as well as the ease with which its genome can be manipulated and analyzed.

. . .

> In recent decades, researchers have utilized an array of innovative genetic technologies to produce custom-made mouse models for a wide array of specific diseases, as well as to study the function of targeted genes. One of the most important advances has been the ability to create transgenic mice, in which a new gene is inserted into the animal's germline. Even more powerful approaches, dependent on homologous recombination, have permitted the development of tools to "knock out" genes, which involves replacing existing genes with altered versions; or to "knock in" genes, which involves altering a mouse gene in its natural location. To preserve these extremely valuable strains of mice and to assist in the propagation of strains with poor reproduction, researchers have taken advantage of state-of-the-art reproductive technologies, including cryopreservation of embryos, in vitro fertilization and ovary transplantation.

(http://www.genome.gov/pfv.cfm?pageid=10005834) (emphasis added). Thus, the knockout mouse has been accepted as one of the premier models for determining gene function.

In addition, commercial use and acceptance is one important indication that the utility of an invention has been recognized by one of skill in the art ("A patent system must be related to the world of commerce rather than to the realm of philosophy." *Brenner v Manson*, 383 U.S. 519, 148 U.S.P.Q. 689, 696 (1966)). Commercial use of the knockout mice produced by Assignee Deltagen has been clearly established. Three of the largest pharmaceutical companies in the world, Merck, Pfizer and GlaxoSmithKline, have ordered the presently claimed PTP36 knockout mouse. This commercial acceptance more than satisfies the practical utility requirements of sections 101 and 112, first paragraph.

Applicant respectfully submits that this is not a case where the sole asserted utility is as an object of use-testing (*See*, *Brenner v. Manson*, 383 U.S. 519, 148 U.S.P.Q. 689, 696 (1966); "We find absolutely no warrant for the proposition that although Congress intended that no patent be granted on a chemical compound whose sole 'utility' consists of its potential role as an object of use-testing, a different set of rules was meant to apply to the process which yielded the unpatentable product"). The dicta in *Brenner* related to the patentability of a chemical compound which itself had no known use. The Court opined that the utility could not solely consist of testing the compound in order to determine a utility for the compound itself. In contrast, the claimed PTP36 knockout mouse is useful for the study of the utility and function of the PTP36 gene, and not for the purpose of establishing a utility for the mouse. The practical

distinction is clear: one skilled in the art would not understand what to do with a compound without a defined use, but would immediately recognize how to use a knockout mouse having a specific gene disruption.

Finally, Applicant notes that in an Office Action dated June 3, 2003, the Examiner rejected the claimed invention as obvious under section 103. The Examiner argued: [t]he ordinary artisan would have been motivated to [produce the claimed PTP36 knockout mouse] to study the precise role PTP36 plays in cell growth, adhesion and cytoskeleton." (p. 11). Thus, while the Examiner previously argued that one skilled in the art would have been motivated to make Applicant's claimed mouse, the Examiner also argues that one skilled in the art would not know how to use such a mouse once created. Applicant submits that the Examiner's previous statements are an admission that the skilled artisan would know how to use the claimed invention, i.e., for determining the function of a gene.

Applicant submits that since one of ordinary skill in the art would immediately recognize how to use the PTP36 knockout mouse in studying gene function, a utility that is specific, substantial and credible, the invention has a well-established utility, thus satisfying the utility requirement of sections 101/112 paragraph 1. On this basis alone, withdrawal of the rejection with respect to the present invention is warranted, and respectfully requested.

In addition, the claimed invention is useful for a particular purpose. The Applicant has demonstrated and disclosed specific phenotypes of the presently claimed mice, i.e., reproductive system and organ and body weight abnormalities. The skilled artisan would immediately recognize that the claimed knockout mouse could be used to further study the role of PTP36 in reproductive system function, or in growth and development, in light of the observed phenotypes.

Applicant notes that the Examiner appears to be requiring that the disclosed phenotypes be linked to a disease, and, in particular, a human disease, in order for the skilled artisan to be capable of using the transgenic mouse. Applicant respectfully submits that the disclosed phenotypes, which include uterine abnormalities, hormonal imbalance, androgenization, increased body weight, increased organ weight, reduced or absent mammary tissue, and increased anogenital distance, are each related to a disorder or condition that may be observed in humans. For example, increased body weight is related to obesity and diabetes. As another example, uterine abnormalities are clearly linked to reproductive system abnormalities or

infertility in humans. However, Applicant respectfully disagrees that such a link or correlation is required to show that the skilled artisan is capable of using the transgenic mouse with the disclosed phenotypes. It is respectfully submitted that the Examiner should assess enablement or utility in light of the nature of the invention. Applicant is claiming a knockout mouse, and not a method of treating or curing a disease, particularly in humans. The burden should not be placed on Applicant to establish a relationship between PTP36 and any disease in humans. This task is more appropriately placed on the commercial and academic entities which would use the present invention in their fields of study. As noted by the Federal Circuit, usefulness in patent law necessarily includes the expectation of further research and development. (*In re Brana,* 34 U.S.P.Q.2d 1436 (Fed. Cir. 1995)). Applicant's specification has already demonstrated a link between the PTP36 gene or protein and the phenotype exhibited by the knockout mice claimed.

Applicant has demonstrated that the skilled artisan would recognize how to use the claimed invention sufficient to satisfy the requirements of the first paragraph of 35 U.S.C. § 112. Withdrawal of the rejection is respectfully requested.

It is believed that the claims are currently in condition for allowance, and notice to that effect is respectfully requested. The Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-1271 under Order No. R-758.

Respectfully submitted,

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